IN THE CLAIMS

Please amend the claims as follows:

Claims 1-17 (Canceled).

Claim 18 (Currently Amended): ~~Bidimensional~~ Multi-dimensional detector for incident ionizing radiation comprising primary particles whose energies are greater than or equal to 100 keV, the detector including:

a block of converting material configured to release secondary particles by interaction with the incident ionizing radiation, ~~whereby~~ wherein a thickness of the block is at least equal to one-tenth of a mean free path traveled by the incident ionizing radiation through the converting material~~, the detector further including~~ ; and

parallel slits crossing the block, the slits filled with a fluid configured to interact with the secondary particles to produce tertiary particles ~~equal~~ indicative in intensity and position ~~to~~ of the incident ionizing radiation, ~~whereby~~ wherein the block is positioned to ensure that the incident ionizing radiation comes in on a first block face where the slits terminate, and wherein a first dimension of a cross-section of at least one of the parallel slits measured in a plane parallel to the first block face is greater than a second dimension of the cross-section of the at least one of the parallel slits measured in the plane parallel to the first block face.

Claim 19 (Previously Presented): Detector as described in Claim 18, wherein the slits are perpendicular to the first face of the block.

Claim 20 (Previously Presented): Detector as described in Claim 18, wherein slit planes form an angle of between 1° and 5° with a line perpendicular to the first face of the block.

Claim 21 (Previously Presented): Detector as described in Claim 18, wherein the fluid is configured to be ionized by the secondary particles, thereby producing electrons as the tertiary particles, and the detector further includes means for creating an electric field for extracting the tertiary particles from the block.

Claim 22 (Previously Presented): Detector as described in Claim 21, wherein the fluid is a gas.

Claim 23 (Previously Presented): Detector as described in Claim 21, further comprising means for analyzing the electrons extracted from the block.

Claim 24 (Previously Presented): Detector as described in Claim 23, wherein the means for analyzing includes an avalanche gas amplifier for producing electron avalanches from the electrons extracted from the block.

Claim 25 (Currently Amended): Detector as described in Claim 24, wherein the fluid is a gas and is configured to convert the electron avalanches into visible or ultraviolet radiation, and the means for analyzing <u>further</u> includes means for detecting the visible or ultraviolet radiation.

Claim 26 (Previously Presented): Detector as described in Claim 25, wherein the means for detecting the visible or ultraviolet radiation includes a camera capable of detecting the visible or ultraviolet radiation, or a matrix of amorphous silicon photodiodes placed against the avalanche gas amplifier.

Claim 27 (Currently Amended): Detector as described in Claim 21, wherein the converting material is an electrical conductor and the block is formed from stacked layers of the converting material, ~~whereby~~ wherein the ~~conducting~~ stacked layers alternate with electrically ~~isolating~~ insulating layers and the stacked layers begin with a conducting layer of the converting material on the first face of the block and ~~ends~~ end with a conducting layer of the converting material on a second face of the block, which is opposite the first face and on which the slits terminate, and the detector further includes means for applying electric voltages to the stacked layers, with electric voltages increasing ~~gradually~~ from the first face to the second face, thereby creating ~~an~~ said electric field.

Claim 28 (Currently Amended): Detector as described in Claim 27, further including a supplementary layer formed on an additional electrically ~~isolating~~ insulating layer, the additional electrically ~~isolating~~ insulating layer being formed on the last layer of the converting material, located at the second face of the block, ~~whereby~~ wherein the supplementary layer is made of an electrically conducting material configured to absorb the secondary particles created in the last layer, and the supplementary and additional layers have slits running through them.

Claim 29 (Previously Presented): Detector manufactured according to Claim 27, wherein the layer of the converting material located at the second face of the block is blackened out to prevent parasitic light reflections.

Claim 30 (Currently Amended): Detector manufactured according to Claim 21, wherein the converting material is electrically ~~isolating~~ insulating, or highly resistive, and the block is ~~created~~ formed from stacked layers of the converting material[[,]] or ~~the converting~~

~~material~~ is made from ~~one single mass of~~ the converting material in a bulk state, ~~whereby~~ wherein the block further includes first and second layers or ~~grills~~ grids which are electrically conducting and formed, respectively, on the first block face and on a second block face~~, the second block face~~ which is located opposite the first block face and on which the slits terminate, and the electric field is created by raising the first layer or ~~grill~~ grid to a first voltage and the second layer or ~~grill~~ grid to a second voltage which is greater than the first voltage.

Claim 31 (Currently Amended): Detector as described in Claim 18, wherein the block is made from a stack of strips made from an ~~isolating converting~~ insulating or highly resistive converting material, and the strips are separated from each other by spacers which define the parallel slits of the block, ~~whereby~~ wherein the block further includes first and second layers or ~~grills~~ grids which are electrically conducting and formed respectively, on the first block face and on a second block face~~, the second block face~~ which is located opposite the first face and on which the slits terminate, and the electric field is created by raising the first layer or ~~grill~~ grid to a first electric voltage and the second layer or ~~grill~~ grid to a second electric voltage which is greater than the first voltage.

Claim 32 (Previously Presented): Manufacturing process for the detector of Claim 18, wherein the block is firstly manufactured and then the slits are manufactured by one of the following techniques:

- waterjet cutting,
- electrical discharge machining,
- roll-out stretch wire.

Claim 33 (Currently Amended): Manufacturing process as described in Claim ~~33~~ 32, wherein the fluid is configured to be ionized by the secondary particles, thereby producing electrons as the tertiary particles, and the detector further includes means for creating an electric field for extracting the tertiary particles from the block, wherein the converting material is an electrical conductor and the block is formed from stacked layers of the converting material, wherein the stacked layers alternate with electrically insulating layers and the stacked layers begin with a conducting layer of the converting material on the first face of the block and end with a conducting layer of the converting material on a second face of the block, which is opposite the first face and on which the slits terminate, and the detector further includes means for applying electric voltages to the stacked layers, with electric voltages increasing from the first face to the second face, thereby creating said electric field, wherein the layers are stuck to each other.

Claim 34 (Currently Amended): Manufacturing process as described in Claim ~~33~~ 32, wherein, before creating each slit, a guide hole is made in the block which is then used to create the slit.

Claim 35 (New): Manufacturing process as described in Claim 32, wherein the fluid is configured to be ionized by the secondary particles, thereby producing electrons as the tertiary particles, and the detector further includes means for creating an electric field for extracting the tertiary particles from the block, wherein the converting material is electrically insulating, or highly resistive, and the block is formed from stacked layers of the converting material or is made from the converting material in a bulk state, wherein the block further includes first and second layers or grids which are electrically conducting and formed, respectively, on the first block face and on a second block face which is located opposite the

first block face and on which the slits terminate, and the electric field is created by raising the first layer or grid to a first voltage and the second layer or ~~grill~~ grid to a second voltage which is greater than the first voltage,

wherein the layers are stuck to each other.

Claim 36 (New): Multi-dimensional detector for incident ionizing radiation comprising primary particles whose energies are greater than or equal to 100 keV, the detector including:

a block of converting material configured to release secondary particles by interaction with the incident ionizing radiation, wherein a thickness of the block is at least equal to one-tenth of a mean free path traveled by the incident ionizing radiation through the converting material;

parallel slits crossing the block, the slits filled with a fluid configured to interact with the secondary particles to produce tertiary particles indicative in intensity and position ~~to~~ of the incident ionizing radiation, wherein the block is positioned to ensure that the incident ionizing radiation comes in on a first block face where the slits terminate; and

a supplementary layer formed on an additional electrically insulating layer, the additional electrically insulating layer being formed on the last layer of the converting material, located at the second face of the block, wherein the supplementary layer is made of an electrically conducting material configured to absorb the secondary particles created in the last layer, and the supplementary and additional layers have channels running through them.

Claim 37 (New): Multi-dimensional detector for incident ionizing radiation comprising primary particles whose energies are greater than or equal to 100 keV, the detector including:

a block of converting material configured to release secondary particles by interaction with the incident ionizing radiation, wherein a thickness of the block is at least equal to one-tenth of a mean free path traveled by the incident ionizing radiation through the converting material;

holes crossing the block, the holes filled with a fluid configured to interact with the secondary particles to produce tertiary particles indicative in intensity and position ~~to~~ of the incident ionizing radiation, wherein the block is positioned to ensure that the incident ionizing radiation comes in on a first block face where the holes terminate; and

a supplementary layer formed on an additional electrically insulating layer, the additional electrically insulating layer being formed on the last layer of the converting material, located at the second face of the block, wherein the supplementary layer is made of an electrically conducting material configured to absorb the secondary particles created in the last layer, and the supplementary and additional layers have channels running through them.

Claim 38 (New): Multi-dimensional detector for incident ionizing radiation comprising primary particles whose energies are greater than or equal to 100 keV, the detector including:

a block of converting material configured to release secondary particles by interaction with the incident ionizing radiation, wherein a thickness of the block is at least equal to one-tenth of a mean free path traveled by the incident ionizing radiation through the converting material; and

parallel holes crossing the block, the holes filled with a fluid configured to interact with the secondary particles to produce tertiary particles indicative in intensity and position ~~to~~ of the incident ionizing radiation, wherein the block is positioned to ensure that the incident ionizing radiation comes in on a first block face where the holes terminate, and wherein a

first dimension of a cross-section of at least one of the parallel holes measured in a plane parallel to the first block face is greater than a second dimension of the cross-section of the at least one of the parallel holes measured in the plane parallel to the first block face.